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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------|-------------|----------------------|---------------------|------------------|
| 10/707,342 | 12/05/2003 | Zhidan Li Tolt | nanogate120303 | 1341 |
| 40051 | 7590 | 09/20/2006 | EXAMINER | |
| ZHIDAN LI TOLT | | | FENTY, JESSE A | |
| 4018 ELLMAR OARS DR. | | | ART UNIT | PAPER NUMBER |
| SAN JOSE, CA 95136 | | | 2815 | |

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/707,342 | Applicant(s) TOLT, ZHIDAN LI |
| | Examiner Jesse A. Fenty | Art Unit 2815 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 20 June 2006.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 40-57,64-68,70,71 and 74-86 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 40-57,64-68,70,71 and 74-86 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) Notice of Informal Patent Application _____
6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/20/06 has been entered.

Allowable Subject Matter

The indicated allowability of claims 55, 56, 64 and 70 is withdrawn in view of the newly discovered reference(s) to Hsu and Nakamoto. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 40-55, 57, 64-68, 71 and 74-86 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In re claims 51, 52, 55, 56, 64 and 70 the limitation, "an emitter layer ... to emit electrons" is vague and indefinite. Specifically, the claim states that the emitter layer is

comprised of an embedding material and at least one nano-structure; wherein the emitter layer has a surface with portions of the nano-structures protruding over the surface. Here's the problem: If the emitter layer has a surface that comprises the embedding material and the nano-structure, the nano-structure cannot then be said to protrude over that same surface of which the nano-structure is a part. In other words, an element (nano-structure) cannot protrude over itself.

Proper correction is required to flesh out the true meaning of this claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 55, 56 and 70, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu (U.S. Patent No. 6,448,701 B1).

In re claim 55 and 56, Hsu (e.g., Figs. 12, 16) discloses a display comprising: an electron source that includes:

a cathode electrode (104) disposed on a substrate (102), the cathode electrode for providing a source of electrons; an emitter layer disposed over said cathode electrode and formed from a

composition of an embedding material (106) and one or a plurality of nano-structures (114) embedded therein, the emitter layer having a surface, portions of the nano-structures protruding above (column 6, lines 7-12) the surface to emit electrons;

an insulator (top portion of 106) disposed over the emitter layer, the insulator having one or a plurality of apertures, each exposing at least the ends of the nano-structures in the emitter layer; and

a gate electrode (108) disposed over the insulator and having one or a plurality of apertures, wherein each aperture exposes a single nano-structure and is concentrically self-aligned with the end of the nano-structure, the gate electrode being operative to control the emission of electrons through the apertures from the exposed nano-structures;

wherein the insulator and the embedding material are composed of the same dielectric material (claim 55) and said insulator functions also as the embedding material (claim 56).

The limitation of claim 70, "wherein said nano-structures are truncated by CMP" is a product-by-process claim which does not further distinguish the structure of the prior art from the pending claim.

Claims 64-67, 76-78, 81-83, 85 and 86, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamoto (U.S. Patent No. 6,097,138).

In re claim 64, Nakamoto (e.g., Figs. 12, 16) discloses a display comprising: an electron source that includes:

a cathode electrode (114) disposed on a substrate (112), the cathode electrode for providing a source of electrons;

an emitter layer disposed over said cathode electrode and formed from a composition of an embedding material (118) and one or a plurality of nano-structures (122) embedded therein, the emitter layer having a surface, portions of the nano-structures protruding above the surface to emit electrons;

an insulator (116; e.g. diamond) disposed over the emitter layer, the insulator having one or a plurality of apertures, each exposing at least the ends of the nano-structures in the emitter layer; and

a gate electrode (128) disposed over the insulator and having one or a plurality of apertures, wherein each aperture exposes a single nano-structure and is concentrically self-aligned with the end of the nano-structure, the gate electrode being operative to control the emission of electrons through the apertures from the exposed nano-structures; and

an anode plate including a transparent anode electrode (176) disposed over a glass substrate (172) and

a phosphor screen (178) disposed over the anode electrode, the anode plate being positioned opposite to said electron source with a vacuum gap disposed therebetween;

wherein electrons are emitted from said nano-structures by applying a voltage between said cathode and gate electrodes, and are made incident on said phosphor screen to make luminous said phosphor screen.

In re claim 65, Nakamoto discloses the device of claim 64, wherein the nano-structures are substantially vertical.

In re claim 66, Nakamoto discloses the device of claim 64, wherein the emitter-to-gate distance for each emitter is substantially less than one micron¹.

In re claim 67, Nakamoto discloses the device of claim 64, wherein in the nano-structures have a surface density substantially higher than $10^6/\text{cm}^2$.

In re claim 76, Nakamoto discloses the device of claim 64, wherein the nano-structures have at least one of their three dimensions (diameter) is the nanometer range."

In re claim 77, Nakamoto discloses the device of claim 64, wherein the nano-structures include nano-tubes or nano-fibers.

In re claim 78, Nakamoto discloses the device of claim 64, wherein the nano-structures have a coating (graphite) for enhanced field emission performance (column 5, lines 13-27).

In re claim 81, Nakamoto discloses the device of claim 64, wherein said nano-structures are individually spaced apart.

In re claim 82, Nakamoto discloses the device of claim 64, wherein the embedding material is comprised of at least two layers (116, 118).

In re claim 83, Nakamoto discloses the device of claim 82, wherein the first layer (118) of the embedding material is conductive.

¹ This can be gleaned from the disclosure (column 5, lines 7-9) which discloses the diameter of each carbon nanotube to be on the order of 30nm or less.

In re claim 85, Nakamoto discloses the device of claim 64, wherein said insulator functions also as the embedding material.

In re claim 86, Nakamoto discloses the device of claim 64. The limitation, "wherein said nano-structures are grown using a ... material" is product-by-process language which does not further distinguish the final structure of the claimed device from the prior art.

Response to Arguments

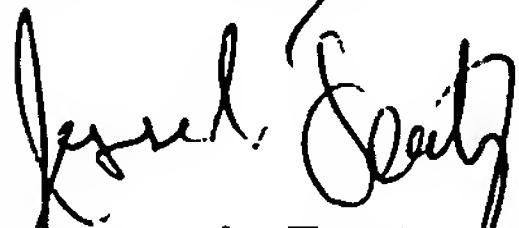
Applicant's arguments with respect to claims 40-57, 64-68, 70, 71, 74 and 75 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

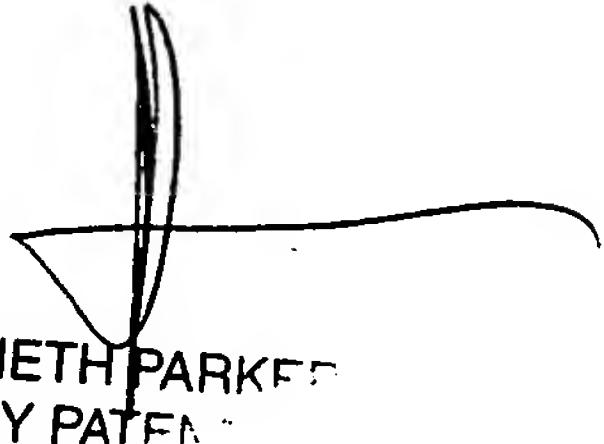
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on M-F 5/4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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